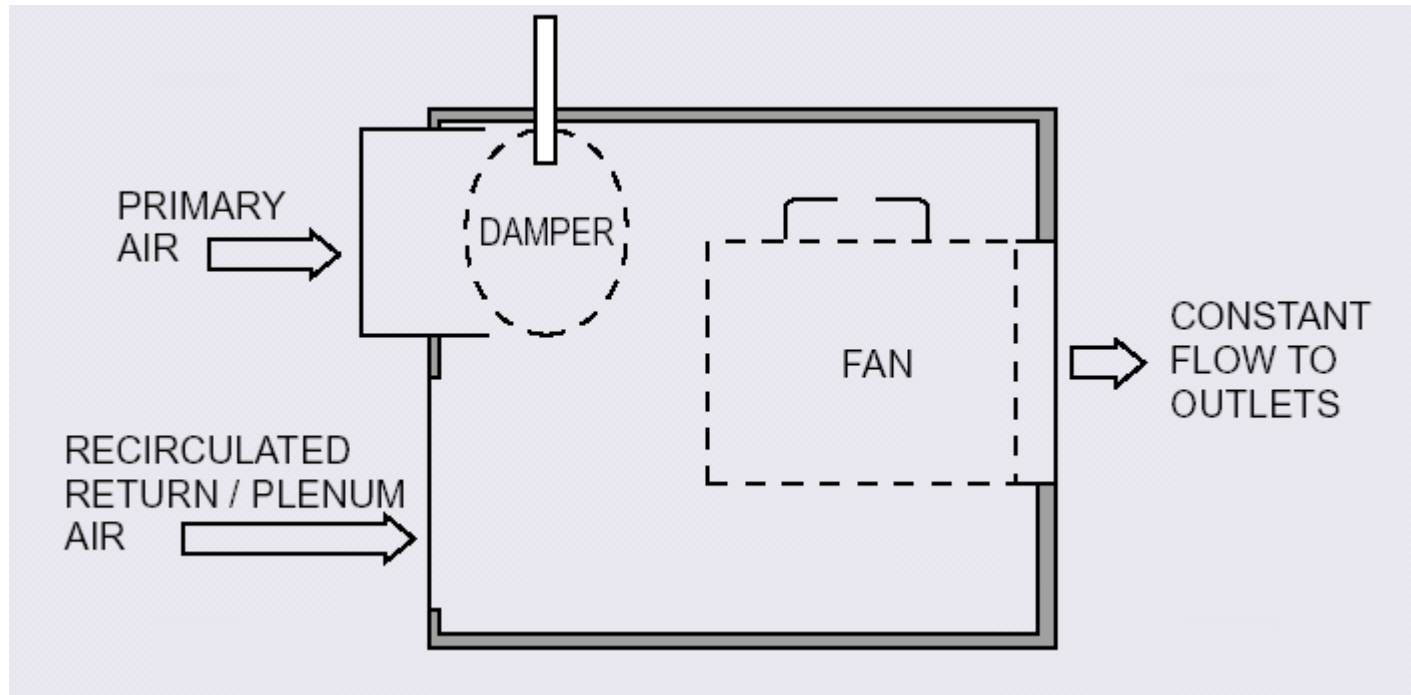


Electronically Commutated Motors (ECMs) in Series Fan Powered Terminal Units

Series Fan Powered Terminal Unit



Source: www.krueger-hvac.com

Typical Motor

- AC induction motor
- $\frac{1}{4}$, $\frac{1}{2}$, $\frac{3}{4}$, or 1 hp
- Typically only 40-50% efficient
- As low as 15-20% efficient at part load
- Primitive speed control

Electronically Commutated Motor

- DC motor
- >70% efficiency
- Efficient at part load due to efficient speed control
- New definition:

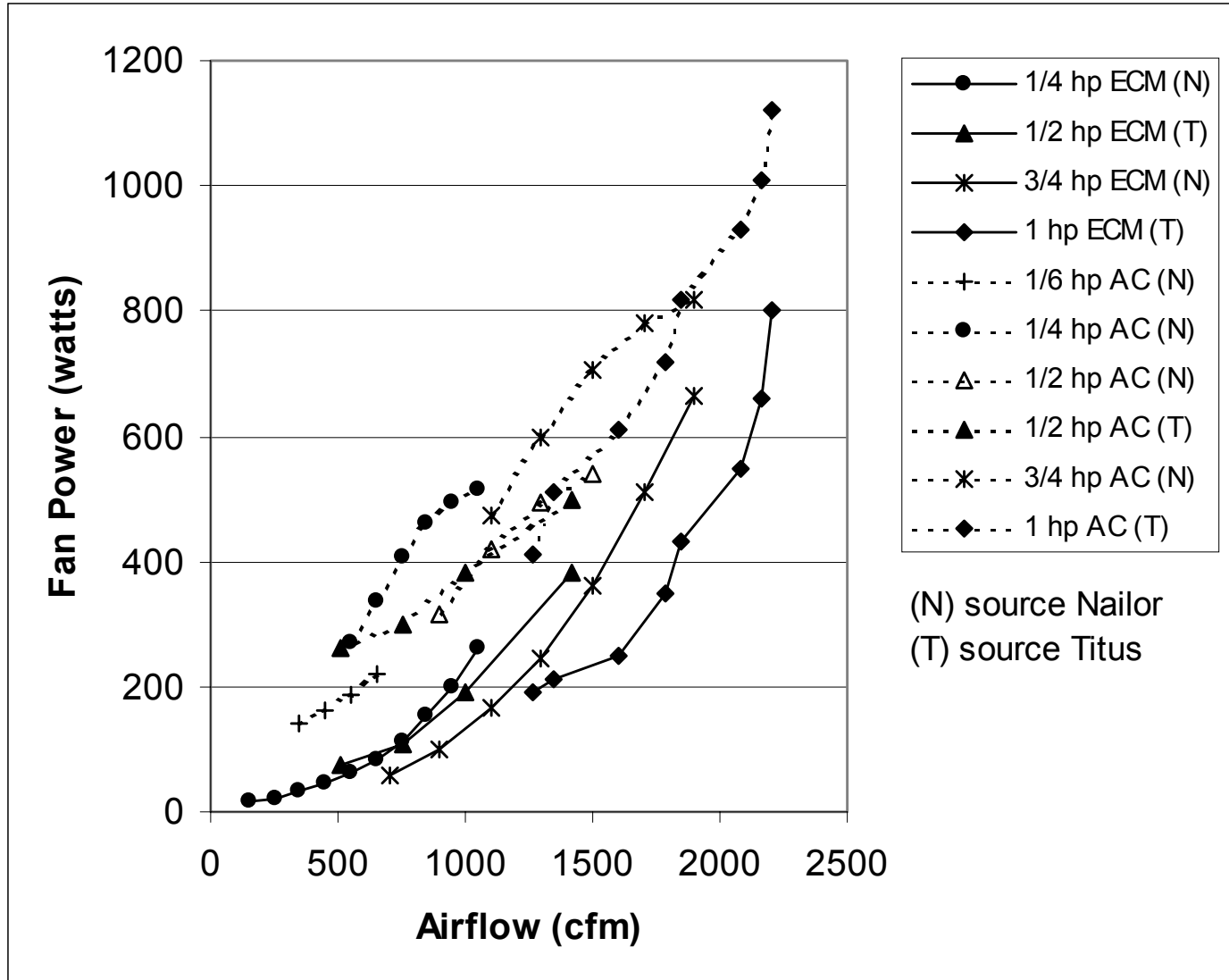
ELECTRONICALLY-COMMUTATED MOTOR is a brushless DC motor with a permanent magnet rotor that is surrounded by stationary motor windings. An electronic controller varies rotor speed and direction by sequentially supplying DC current to the windings.

New Requirement

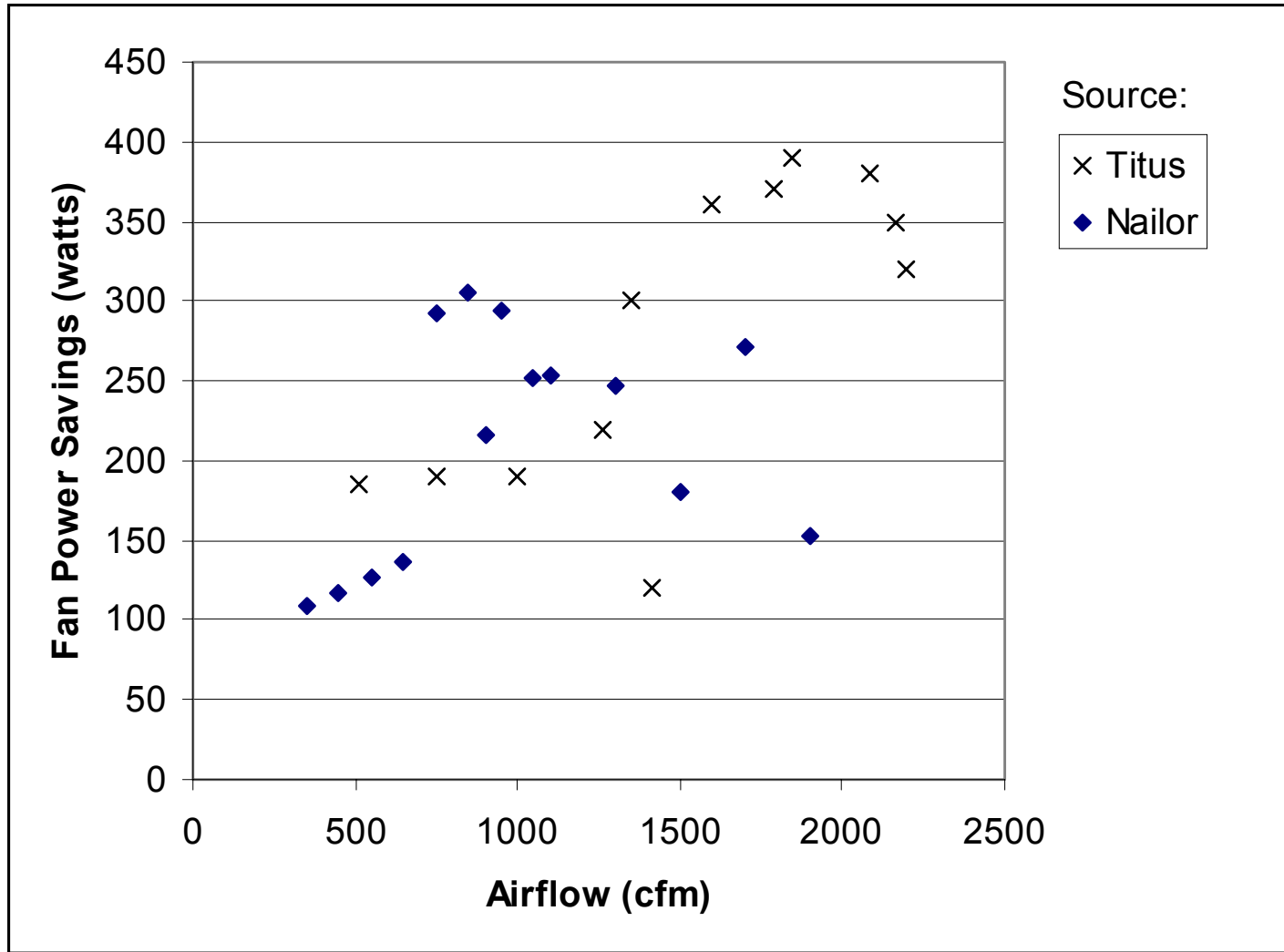
Added to §144(c)2:

- C. Fan motors of 1 horsepower or less in series terminal units shall be electronically-commutated motors or shall have a minimum motor efficiency of 70% when rated in accordance with NEMA Standard MG-1 at full load rating conditions.

Fan Power Comparison



Fan Power Savings



Savings

Airflow (cfm)	Savings (watts)		Savings (kWh/yr)		Savings (\$ present value)	
	Low	High	Low	High	Low	High
500	110	185	466	784	\$639	\$1,075
1000	190	310	806	1,314	\$1,104	\$1,801
1500	120	320	509	1,357	\$697	\$1,859
2000	150	390	636	1,654	\$871	\$2,265

Cost Effectiveness

- Mfr cost of \$155 to \$250 extra per motor
- \$200 to \$325 assuming 30% markup
- Costs are significantly lower than life-cycle savings.